
# Empowerment of Rural Households in Zambia : The Project for Participatory Village Development in Isolated Areas in Chongwe District, Lusaka Province

| | |
|---|---|
| 著者 | Mungalaba Shadreck |
| journal or publication title | Journal of Developments in Sustainable Agriculture |
| volume | 2 |
| number | 2 |
| page range | 145-158 |
| year | 2007 |
| URL | http://hdl.handle.net/2241/98790 |

*Journal of Developments in Sustainable Agriculture 2: 145–158 (2007)*

# Empowerment of Rural Households in Zambia: The Project for Participatory Village Development in Isolated Areas in Chongwe District, Lusaka Province

Shadreck Mungalaba

Graduate School of Life and Environmental Sciences, University of Tsukuba,
Tsukuba, Ibaraki 305–8752, Japan

The rural people of Zambia, who make up 61% of the total population, have remained predominantly poor since independence, with an overall poverty level of about 73%, compared with 53% for their urban counterparts. Two-thirds of the rural poor are extremely poor. The fight against poverty has therefore been an ongoing one with a focus on rural areas. In Chongwe District, the communities keep up the fight with the support of the Japan International Cooperation Agency through the Project for Participatory Village Development in Isolated Areas, working in 43 villages to implement micro projects.

This study aimed first to estimate the income and productivity of households and identify the factors affecting income generation and crop production in the project villages. Second, it aimed to assess how the villagers chose the income generation and infrastructural activities that they undertook in their micro-projects in Chongwe District. We found that, although household income and productivity had not changed markedly, the effects of the project's interventions were positive. Community assets were beginning to support production in many villages. Micro-projects that create community assets may contribute to the lasting solution of poverty among rural households in Zambia by improving household incomes and productivity.

**Key words**: Community management capacity, participatory development, household income and production, technical extension and training, PaViDIA in Zambia

## 1. Introduction

Critical to the success of community development is how much power the community has to participate in its own development. For a community to drive its own development, the citizens must contribute knowledge, time, and other resources to this process (Beard, 2007); unless they are enabled to do so, their participation will fail to attain the desired benefits. This is so because rural householders—sometimes referred to as peasants—are rarely prosperous, often lead precarious existences, and include some of the poorest people in the world (Ellis, 1992).

El Ghonemy (1984) stated that rural people need to be involved in their own development and gain economic power through increased access to productive assets; share in sociopolitical power by taking part in decision-making through organizations of their own choice; have incentives to contribute to increasing production through institutional organizational arrangements; and share in opportunities for the rewards and benefits of growth to improve their nutrition, productive skills, and human skills and to exchange their labor and production to meet essential needs. To improve rural people's prospects, we need analytical methods that will yield an accurate perception of the nature of these people's problems (Ellis, 1992) and of what steps will contribute positively to any improvement.

The Project for Participatory Village Development in Isolated Areas (PaViDIA) in Zambia has

Received: October 3, 2007, Accepted: November 8, 2007
Corresponding author's current address: Ministry of Agriculture and Cooperatives, PO Box 35301, Lusaka Province, Zambia. Mobile: +260–966–783581, E-mail: smungalaba@yahoo.com

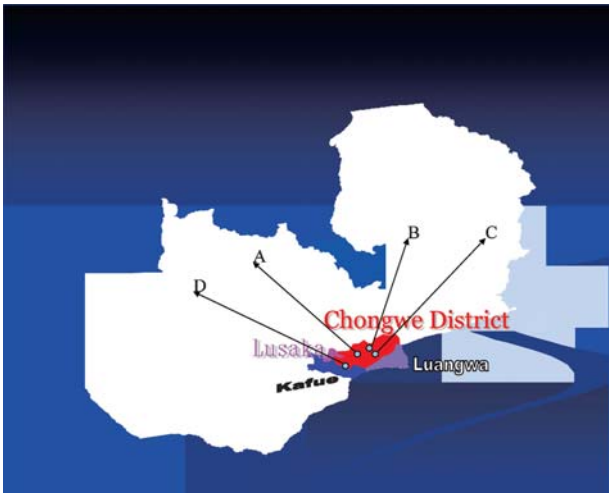


**Fig. 1.** Map of Zambia, showing the Chongwe study area and other districts in Lusaka Province.

been implemented with a focus on community capacity development through income generation and the instigation of community infrastructure activities. Our study aimed to: (1) estimate household income and productivity and identify the factors critical to household income and productivity in the villages involved in the project; (2) assess community assets and the introduction of infrastructure in the project areas; and (3) use the results as a basis for formulating policy proposals to improve the monitoring of follow-up activities in Lusaka Province in general and Chongwe District in particular.

Section 2 of this paper provides basic information about PaViDIA. Section 3 describes the data used for the analysis. In Section 4, production and income equations are estimated and the community capacities for planning, implementing and monitoring community activities in some villages are evaluated. Finally, Section 5 discusses the implications of the analysis.

## 2. PaViDIA

### 2.1 PaViDIA Background and Management

The office of the Provincial Agricultural Coordinator (PACO), Lusaka Province, requested grant assistance from the Government of Japan through the Japan International Cooperation Agency (JICA) to implement a pilot micro-project on poverty alleviation in Chongwe District. The project started in September 1999, with the Center for Integrated Rural Development for Asia and the Pacific (CIRDAP) Approach to Rural Development (CARD) being applied by the Ministry of Agriculture and Cooperatives (MACO) in Lusaka Province, working with JICA. The objective was to apply and ascertain the effectiveness of CARD in developing Zambian rural communities. Using this approach, two micro-projects were started in two villages. A modified CARD approach called Participatory Approach to Sustainable Village Development (PASViD) was formulated to take into consideration the Zambian experience. This approach was then applied to 17 new villages in the subsequent years up to 2001.

On the basis of these experiences gained between 1999 and 2001 by MACO and JICA, a further request was made to JICA to implement the PaViDIA project in Zambia. The project received support and was implemented in 2002 (JICA, 2006). The project supported 24 other villages from 2002 to 2006 in implementing their own micro-projects, bringing the total to 43 villages that benefited from this initiative.

Income-generating activities (IGAs) chosen by villagers and continuous training through extension services are the two main aspects of PaViDIA. The Project Director and the Manager are, respectively, the Director of Planning and Director of Agriculture at MACO. The Provincial Agricultural Coordinator's office is involved in supervising the project activities while working with the District Agricultural Coordinator. At the implementation level, expatriate experts working with local experts from MACO advise on various aspects such as monitoring, evaluation, village development, and sustainable agriculture, including conservation farming. Others include the Assistant Project Manager, Program Officers, and Farm Manager who runs demonstrations. At a field level, Extension Workers interface with members of the communities in the agricultural camps. Each district is divided in subdistricts called extension blocks which are further divided into extension camps covering a number of villages referred to as communities in this paper. Both blocks and camps are manned by extension workers.

PaViDIA asks villagers to participate and make management decisions voluntarily. That is, the vil-

lagers, as would-be beneficiaries, take part in the development of their own villages by helping to identify problems and plan and implement activities through Participatory Rural Appraisal and Project Cycle Management methods. (JICA, 2006) In this way the communities make decisions to create improvements in the living standards in their own villages. The villagers participate in the implementation of the project by supplying local materials and voluntary labor. With project funding called "seed money," the villagers are able to implement income-generating and infrastructural activities. Through its extension workers at the District level, MACO trains the villagers in various aspects relevant to the choice of activities. Examples of subjects are leadership, business management, production techniques, poultry management, grocery management, and gender awareness.

To make this development sustainable, PaViDIA requests that villages keep the proceeds from the IGAs or from the activities derived from the introduced infrastructure as "community funds" in the hope that these funds will be used for future IGAs or infrastructure. Because this project has just started, it is too early to evaluate the outcome from only the income gain of villagers. However, it should be noted that some communities' activities and infrastructure can indirectly contribute to the income gains of individuals. For example, the introduction of hammer mills means that some household members can use the time saved in milling the grains to work or (in the case of school children) receive education. Some of these indirect effects will be reviewed after 2 or 3 years of implementation.

The standard of living of villagers affects the ways in which they make decisions for or against one IGA or item of infrastructure. Because it is inappropriate to evaluate the community's capacity to manage their own activities only from the amount of community funding the villagers have saved, it is important to understand some of the factors behind the villagers' decision-making on IGAs or infrastructure.

### 2.2 Profile of Study Area

Lusaka Province has four districts: Luangwa, Lusaka, Kafue, and the largest, Chongwe. Over half of the rural households in the province are concentrated in Chongwe (Chongwe District Council, 2006). The average agricultural production and productivity is also higher in Chongwe (Central Statistical Office, 2004). The district lies about 50 km east of Lusaka City. The district's population in the 2000 census was 144,736, 1.4% of the total national population and 10.1% of the population of the province. Annual growth of the population in the district is estimated to be 4.2%, far above both the national and provincial averages of 2.9% and 3.8%, respectively. This population is sparsely distributed across the district, with higher concentrations in the district center and suitable farming areas. More than 75% of household income in the district is derived from agriculture-related ventures, as either own production or sale of agricultural produce and by-products (Central Statistical Office, 1998).

This study was based on household baseline data collected in surveys carried out in Chongwe by PaViDIA. However, the results are expected to be reasonably representative of rural areas in Lusaka Province. The farming systems and livelihood characteristics are similar among districts in terms of technologies, land ownership, and farm management skills. Other similarities include socioeconomic characteristics such as input supply and output marketing systems. The incidence of poverty is high in rural areas, and the economy is based on farm agricultural production.

## 3. Data and Survey Information

For the purpose of this study, it was important to access information describing living standards, IGA status, and the community management capacity and infrastructure in relation to the community decisions. The study based the analysis mainly on information obtained from two sources. The first source was a baseline survey conducted by the PaViDIA office in 2004, and the second was an informal direct interview survey (as part of monitoring) of villages in 2006 by the author of this report.

### 3.1 Baseline Survey

Baseline surveys have been conducted every year since 2002, but the coverage of villages differs between and among surveys. This paper analyzes the results of the 2004 survey, which covered micro-

project villages in the Chongwe district. This survey included questionnaires for sampled households and for communities.

### 3.1.1 Household Survey

The baseline survey had a target sample size of about 300 households taken from 15 agricultural camps. The household questionnaire was designed to collect information on seven sets of variables for each household: household composition, condition of housing, household income, standard of living, farming, problems in agriculture, and everyday needs.

A random sample of households was obtained through a two-stage sampling procedure whereby the villages within an agricultural camp were the primary sampling unit and the households the primary elements. Each camp constitutes villages. Number of villages in each camp not known camp was allocated 20 households for sampling purposes.

### 3.1.2 Community Survey

The community dataset on which this study was based was also generated by PaViDIA during a community survey that was implemented in 15 communities, 13 of which returned the questionnaires. A total of 2,136 individuals were covered (not questionnaires but number of people in villages that gathered to respond to the community questionnaire) in the survey: 1,086 males and 1,050 females. We estimated, (PaViDIA, 2004) that across the 13 communities in the survey the average household size was five persons. The community questionnaire focused on community funds, village environmental conservation, community empowerment, HIV/AIDS, community economy, social facilities, and community management capacity development.

## 3.2 Direct Interview Survey

We also conducted a direct interview survey. At the end of 2006 the author collected information on the performance of the 10 village micro-projects. The information collected included participation of both male and female heads of households in micro-projects; community funds or savings used as project funds ("seed funds from Table 3 shown only as a ratio"); micro-projects undertaken to generate funds for the community and infrastructural activities; and perception of the leadership by those in attendance during the meetings at the community project centers. Members of the communities visited provided the information during group discussions with the villagers and their leaders, and the MACO District Office provided key reports. The villagers also explained the processes they used to make decisions as a community during the planning and implementation of micro-projects.

# 4. Analysis

To gain an understanding of the empowerment of villagers in PaViDIA, we focused not only on community management capacity by revealing the ways in which community funds were managed and on the villagers' own identification of their management problems, but also on the villagers' decision-making in terms of IGAs and infrastructure choices. It is understandable that the villagers' decisions are related to their identification of the constraints on improvement in their standard of living. In this context, an understanding of the relationship between one community's profile and its choices of IGAs and infrastructure is paramount in any evaluation of the community's capacity. This relationship was analyzed on the basis of the direct interview survey. Before the analysis was performed, productivity and income-earning factors were identified because these factors can sometimes present as constraints. The factors were identified from the estimates of income-earning and production in the 2004 baseline survey.

## 4.1 Identification of Factors Markedly Affecting Crop Production and Income Earning

Two functions were constructed to estimate household production and income: one equation for maize production and one equation for income per household member aged 15 years or more. This choice was made because maize is the most important crop grown by most small- and medium-scale farmers for both home food consumption and sale (Central Statistical Office, 2004). Both functions were formulated as log-linear models, and they included household characteristics and dummy variables for the agricultural camp data. For both functions, the list of explanatory variables is as follows:

**For Maize production**: Log of maize production was regressed on the log of maize crop area, log of number of hoes owned per household' (as capital),

log of number of household members aged 15 years or more, log of the ratio of number of females to the total number of household members aged 15 years or more, dummy variable for female-headed households, dummy variable for irrigation, dummy variable for chemical fertilizer use, and dummy variables for the agricultural camps involved in the survey (see results below).

**For Income**: Log of income per household member aged 15 years or more was regressed on the log of total crop area, log of number of household members aged 15 years or more, education level of household head, log of the ratio of number of females to the total number of members aged 15 years or more, dummy variable for female-headed households, dummy variable for irrigation, and dummy variables for the agricultural camps.

Here, agricultural camp dummy variables included such variables as the effects of soil conditions, markets and prices, non-farm job accessibility, and differences in the characteristics of local societies. To set up the camp dummy variables, the Chainda camp, located nearest to Lusaka, was treated as a benchmark camp, so no dummy variable was introduced for Chainda. The irrigation dummy variable was used in the estimation of income because of the contribution of irrigation to the production of commercial crops such as fruits and vegetables.

The results of application of the empirical model specified in the production function equation are presented in Table 1. It is vital to note that, for technical reasons and to reduce the variability in the sample size, during the data manipulation we dropped entries in the household data with zero responses and production levels of above 4,000 kg/ha from the analysis.

The main results were as follows:

The area of maize cultivated had a strongly positive significant effect in increasing production with a $p$-value $= 0.000$. Increasing the area of cultivation by 1% improves the chances of increasing production by about 0.98%, thus rewarding the farmer. This figure seems to be larger than those in typical discussions of production functions. The actual fertilizer amounts used were not available, so a dummy variable for chemical fertilizer use was introduced to the estimation. The effects of this seem to have been included in the larger production elasticity of the cultivated area.

Chemical fertilizer use, $p$-value $= 0.025$ was also positively and significantly correlated with maize production. Extending fertilizer use to many more farmers—especially small-scale farmers—would increase the production of maize by about 26% in the survey area.

The logarithm of the number of hoes possessed by households was also positively and significantly correlated with maize production, at the 10% significance level. See Table 1. This asset was used as a capital item in the estimation of production. Because of the unavailability of data, animal draft power, despite its importance as capital, was not used in the estimation. However, from this production estimation we understood that the holding of hoes in the households as an example of capital inputs was important in maize production. Thus, the application of technology to production can positively increase the production of maize.

The irrigation dummy variable was also positively and significantly correlated with maize production at $p$-value $= 0.079$. Although maize production is usually rain-fed in the survey areas, this result can be interpreted as indicating that accessibility to irrigation contributed to contingent water resource use during unfavorable weather conditions. Dummy variables for Lwimba, Lukwipa, Mwachilele, and Rufunsa were significantly and positively correlated with maize production, meaning that these areas had the advantage of producing more crop than Chainda when the other production factors were controlled for.

We next analyzed the relationship between a number of explanatory variables and income per household member able to work (i.e. aged 15 years or more). The results are summarized in Table 2.

The total area cultivated was significantly positively associated ($P < 0.01$) with household income. A 1% increase in the crop area was likely to increase income by about 0.7%. This result seems reasonable because Chongwe depends largely on agriculture and agriculture-related income-generating enterprises.

As expected, the effect of the number of household members aged 15 years or more on income per member was negative ($p < 0.05$). The strongly negative value of the coefficient ($-0.8068$) indicates that the total income-earning elasticity of house-

**Table 1.** Relationship between explanatory variables and maize production ($n=232$) (based on data from the 2004 baseline survey)

| Independent variable: log of maize production | Coefficient | Std. error | $P$ value |
|---|---|---|---|
| Intercept | 5.0155 | 0.2399 | 0.000*** |
| Log of maize crop area | 0.9798 | 0.0712 | 0.000*** |
| Log of number of hoes per household | 0.1829 | 0.1016 | 0.073* |
| Log of no. of members 15 years or older | −0.0804 | 0.0883 | 0.364 |
| Log of no. of females as a ratio of total no. of members 15 years or older | −0.1653 | 0.1298 | 0.204 |
| Dummy variable for female-headed households | −0.0447 | 0.1206 | 0.711 |
| Dummy variable for irrigation availability | 0.2251 | 0.1273 | 0.079* |
| Dummy variable for chemical fertilizer use | 0.2614 | 0.1155 | 0.025** |
| Dummy agricultural camp variables | | | |
| Chinkuli | −0.1600 | 0.2345 | 0.496 |
| Chiyota | 0.1069 | 0.2506 | 0.670 |
| Kapete | −0.0336 | 0.2304 | 0.884 |
| Lukoshi | −0.2662 | 0.2272 | 0.243 |
| Lukwipa | 0.5527 | 0.2486 | 0.027** |
| Lwimba | 0.6978 | 0.2515 | 0.006*** |
| Mwachilele | 0.5808 | 0.2390 | 0.016** |
| Mwalumina | 0.2605 | 0.2158 | 0.229 |
| Namanongo | −0.1380 | 0.2286 | 0.547 |
| Ndubulula | −0.0366 | 0.2464 | 0.882 |
| Palabana | 0.2654 | 0.2212 | 0.232 |
| Rufunsa | 0.4997 | 0.2300 | 0.031** |
| Shellen | −0.2248 | 0.2230 | 0.314 |
| Sinjela | −0.0137 | 0.2328 | 0.953 |
| $R^2$: 0.6674; adjusted $R^2$: 0.634. | | | |

*** 1% significance level; ** 5% significance level; * 10% significance level

hold members aged 15 years or more was about 0.2—that is, a 1% increase in the number of members results in only a 0.2% increase in household income. It may be useful to note that this particular explanatory variable was income per worker. This result may be related to differences in productivity or income-earning ability among household members: if younger members were able to contribute less to household productivity because they are less experienced in production activities, then the income (productivity) per member aged 15 years or more would decline. Similarly, if the younger household members in this category were attending school they would have less time to earn an income, and this would also reduce the mean income per household member.

The education level of the head of the household was positively associated with income at $p<0.024$.

**Table 2.** Relationship between explanatory variables and income per household member 15 years or older ($n=214$) (based on data from the 2004 baseline survey)

| Dependent variable: log of income per household member 15 years or older | Coefficient | Std. Error | $P$ value |
|---|---|---|---|
| Intercept | 12.5496 | 0.4195 | 0.000*** |
| Log of total crop area | 0.6901 | 0.1145 | 0.000*** |
| Log of no. of members 15 years or older | −0.8068 | 0.1391 | 0.000*** |
| Years of education of household head | 0.0656 | 0.0288 | 0.024** |
| Log of no. of females as a ratio of total no. of members 15 years or older | −0.3695 | 0.2135 | 0.085* |
| Dummy variable for female-headed household | −0.3281 | 0.2267 | 0.149 |
| Dummy variable for irrigation availability | 0.1377 | 0.2111 | 0.515 |
| Dummy agricultural camp variables | | | |
| Chinkuli | 0.5290 | 0.3929 | 0.180 |
| Chiyota | −1.3266 | 0.4603 | 0.004*** |
| Kapete | −1.0508 | 0.4585 | 0.023** |
| Lukoshi | −0.9930 | 0.4016 | 0.014** |
| Lukwipa | −0.8057 | 0.3947 | 0.043** |
| Lwimba | −1.9653 | 0.3881 | 0.000*** |
| Mwachilele | 0.4707 | −0.4033 | 0.245 |
| Mwalumina | 0.6587 | −0.3701 | 0.077* |
| Namanongo | 0.8658 | −0.4064 | 0.034** |
| Ndubulula | −2.2476 | 0.4201 | 0.000*** |
| Palabana | 0.1358 | 0.3774 | 0.719 |
| Rufunsa | −1.2446 | 0.3677 | 0.001*** |
| Shellen | −2.4639 | 0.4096 | 0.000*** |
| Sinjela | −1.5645 | 0.4655 | 0.001*** |
| $R^2$: 0.4902, Adjusted $R^2$: 0.4371. | | | |

***1% significance level; **5% significance level; *10% significance level

This means that more highly educated heads of household were more likely to have higher incomes than less educated heads of household. This could be because educated household heads were more able to access information available through newspapers and other media and thus more able to negotiate for better prices and find more profitable bargains in the agricultural market as Kapekele (2006) observed that more educated farmers tend to be more risk lovers than those who are less educated. It is also likely that educated farmers would more easily find non-farming job opportunities, especially in the form of permanent employment.

The contribution of female labor, which was taken as the ratio of the number of females to the total number of farmers above 15 years of age, was negatively and significantly correlated (at 10% significance level) with income. This means that, although women may have worked just as hard as

men, their effect on income was negative when considered within the combined variable. This shows further that an increase in labor with the same level of technical input did not increase income per labor unit but instead reduced it. An alternative way to understand this effect is that female household members may have contributed to non-monetary household work such as preparing meals, caring for household members, and growing food for on-farm consumption. Additionally, female members were sometimes disadvantaged in obtaining non-agricultural jobs, especially in the form of permanent employment because of cultural and social burdens and problems with the type of work. The non-significant result of this same variable in our estimation of the production function helps us to further understand the roles of women in maintaining the household's living standard—a criterion that was not measured.

The correlation coefficients for the camp dummy variables showed that, after we had controlled for the household characteristics included as explanatory variables, these camps had no income-earning advantages over Chainda. This finding is consistent with the fact that Chainda is located closer to Lusaka City and has better access to markets for farm crops and to non-farming job markets that offer an alternative to the camps.

In the estimation of the maize production function, irrigation accessibility, chemical fertilizer usage, production capital, and crop area were identified as significant factors. This understanding can aid our interpretation of villagers' decisions on the introduction of infrastructure, as discussed in the next sub-section. In the estimation of income function, number of hoes held by households and human capital were identified as important factors in income generation. These findings point to the need for an efficient extension and training system in PaViDIA through the MACO extension system. In addition, the results of application of the dummy agricultural camp variables in the income function analysis showed that market accessibility for products and access to non-farm jobs are vital in generating income opportunities. In fact, as it will be shown later, it seems possible that non-farming job opportunities affect community management capacity in the PaViDIA model of village development.

### 4.2 Evaluation of Community Management Capacity

The author visited and collected information from 10 villages under micro-projects of PaViDIA, but only four of them (identified here as villages A, B, C and D) were also included in the 2004 baseline survey. Consequently, this analysis has a sample of only four villages.

The information from the author's direct interview contains the basic profiles of each village. The types of IGAs and infrastructure, the proportion of community funds saved for seed money as of the end of 2006, and constraints identified in each community or village, as well as other information from the community baseline survey are shown in Table 3.

Table 4 presents information from the sampled household profiles taken from the household questionnaires in the 2004 baseline survey. Although the sample size was only about 20 households for each village, the sampled households' profiles, covering income sources, educational attainment, crop diversification, and others, can contribute to our understanding of the background to the decision-making processes of communities.

Table 5 shows the problems identified from the community questionnaires in the 2004 baseline survey. The list of problems covers the various aspects of living standards in the community. It is apparent that this problem identification reveals community constraints. In other words, if introducing a micro-project or item of infrastructure is understood as an opportunity to at least remove these constraints, then the community's decisions to introduce IGAs or infrastructure will be related to the strength of those constraints.

Although only average figures are presented in Table 4, I will describe some profiles in detail. The age distribution of the community members that participated in the survey ranged from 21 to 85 years (mean 57 years). About 60% of the villagers were below the age of 50 years. The education levels attained in all the four villages analyzed were below or equal to grade nine basic education level, and over half had only done up to grade seven.(the end of primary school). Interestingly, the older farmers in all four villages had lower education levels.

Besides the age distribution of the communities,

**Table 3.** Community evaluation based on direct interviews with communities and District Office (from responses to community questionnaires in the 2004 baseline survey; see Table 5)

| | Village A | Village B | Village C | Village D |
|---|---|---|---|---|
| No. of households | 196 | 112 | 55 | 79 |
| No. of female-headed households | 64 | 28 | 15 | 21 |
| No. of male-headed households | 132 | 84 | 40 | 58 |
| Community infrastructure chosen | Community hall Poultry house | Wells, health post, house for health worker | Storage shed | Hammer mill building |
| Income-generating activities | Consumer shop, animal draft power, irrigation pump, sewing machines, poultry | ADP, goats, hammer mill, winter maize, maize marketing | Oil presser or expeller, storage shed, goats, consumer shop | ADP, goats, agro-inputs |
| Constraints identified* | A, B, C, D, F, G, H, I, K, L, N, P, S, T | A, B, C, D, E, F, H, J, K, M, N, P, Q, R, S, T, V, W, X, Y | B, D, L, U, V, Y | A, B, C, D |
| % of community savings to seed funding | 13.65 | 18.14 | 24.19 | Negligible |
| Training activities | Project cycle management, leadership, financial management | Entrepreneurship, livestock production, leadership | Leadership, entrepreneurship, conflict management, constitution-making | Conservation farming, animal husbandry, leadership |
| Distance to market (km) | 55 | 80 | 80 | 30 |
| Leadership quality | Good | Good | Good | Poor |

the incomes of the communities were also low. Variations were observed among the villages. Village D had a higher average, with 10 of the respondents (50%) having an income of 2 million †ZMK per year. Village B had only three respondents earning above 2 million ZMK, whereas villages C and A had one and none, respectively.

The sources of income not only varied within a village but also varied among the villages. In villages A, B and C, most of the income came from farm sources, represented by products from activities such as growing field and horticultural crops. In these villages there were fewer farmers involved in either temporary or permanent non-farm employment. In contrast, in village D a higher number of farmers gained their incomes from non-farm activities; as many as 7 households (35%) had at least one member in permanent employment. When other non-farm income sources such as crafts, trading, property rental and temporary employment were considered, as many as 17 households (85%) were found to depend on non-farm sources of income. Income share from employment, trading and other non-farm sources accounted for about 78% of household income in village D (Table 4). Most importantly also was the fact that almost every respondent whose income

† ZMK: Zambian Kwacha

**Table 4.** Mean characteristics of the households in each village (based on the PaViDIA 2004 baseline survey)

| Village | A | B | C | D |
|---|---|---|---|---|
| Number of household members | 6.50 | 6.20 | 7.50 | 7.45 |
| Number of household members 15 years or older | 4.15 | 3.20 | 5.61 | 4.20 |
| No. of females as a ratio of total no. of household members years or older | 0.47 | 0.54 | 0.45 | 0.52 |
| Age of household head | 51.85 | 46.50 | 41.90 | 47.95 |
| Years of education of household head | 7.24 | 6.56 | 7.59 | 9.24 |
| Dummy variable for female-headed household | 0.15 | 0.15 | 0.30 | 0.15 |
| Crop diversification index (CDI)* | 0.44 | 0.06 | 0.62 | 0.29 |
| Maize as proportion of total crop production (%) | 73.98 | 99.03 | 42.12 | 82.06 |
| Ground nuts as proportion of total crop production (%) | 10.25 | 0.97 | 19.72 | 5.65 |
| Dummy variable for chemical fertilizer use | 0.68 | 0.65 | 0.75 | 0.95 |
| Dummy variable for irrigation availability | 0.35 | 0.00 | 0.00 | 0.00 |
| Total income | 399375 | 713333 | 1468056 | 14962750 |
| Income per household member | 80446 | 121449 | 196530 | 1600143 |
| Income per household member 15 years or older | 132299 | 222120 | 251667 | 2413493 |
| Income share from farming (%) | 74.52 | 50.33 | 92.55 | 21.35 |
| Income share from fishing (%) | 0.00 | 0.00 | 3.09 | 0.00 |
| Income share from employment, trading, and other (%) | 25.48 | 49.67 | 4.37 | 78.65 |

**Note:* $CDI = 1 - \sum^{m}_{i} Li^2$ where $Li$ denotes the share of the *i-th* crop area in total crop area

was above ZMK 1 million was engaged in more than one activity to generate income. A combination of three or more crops and other enterprises were common for most of the farmers. Additionally, the farmers who relied on one source of income tended to be on the lower side of the income distribution when compared with those with more sources.

Total crop production (all crops put together) was another aspect of interest in the villages to consider. On average, village B had higher production per household than the other villages. Without taking into consideration the quantities or areas of cultivation of the crops grown in the four villages, a more diverse variety of crops was grown in villages A and C. Villages A, B and D grew more maize than any other crop. Village B grew only maize and groundnuts (Table 4).

An attempt to understand how villagers decided on a particular combination of infrastructure and IGAs chosen yielded interesting findings. Table 3 shows an evaluation of the choices made in the four villages, and Table 5 shows the scoring and coding for the community constraints in accordance with their frequency of mention. A total of 25 constraints identified in the 2004 survey of the total sample were coded and then compared with the four villages' infrastructure and IGA choices. We found that the occupants of all the villages considered their constraints when choosing infrastructure and IGAs.

Low crop yields, limited access to safe drinking water, low income among households, and poor soil fertility were among the problems most commonly mentioned by villagers. This resulted in the choice of micro-projects such as obtaining animal draft

**Table 5.** Community constraints: coding and scoring (frequency ATM3 of mention) (based on the PaViDIA 2004 baseline survey)

| Coding | Constraint | Scoring | Coding | Constraint | Scoring |
|---|---|---|---|---|---|
| A | Low income among households | 3 | N | Inadequate animal draft power and other farm implements | 2 |
| B | Low crop yields | 4 | O | Lack of skills in various areas | Nil |
| C | Poor soil fertility | 3 | P | Lack of loans to support production | 2 |
| D | Limited access to safe drinking water | 4 | Q | Lack of storage sheds | 1 |
| E | High illiteracy rates in the community | 1 | R | Animal diseases and inadequate dip tanks | 1 |
| F | General poor health and high incidence of diseases | 2 | S | Poor housing for community members | 2 |
| G | Food insecurity | 1 | T | Limited access to hammer mills | 2 |
| H | Poor road and transport network | 2 | U | Lack of knowledge and business skills | 1 |
| I | Lack of improved toilets | 1 | V | Too long a distance to the health center | 2 |
| J | Inadequate market access and infrastructure | 1 | W | Lack of social amenities | 2 |
| K | Unemployment | 2 | X | Unplanned cutting of trees | 1 |
| L | Environment not conducive to child education | 2 | Y | Other human capital | 2 |
| M | Poor access to agro-inputs | 1 | | | |

power, poultry and piggery production, buying fertilizer, seed purchasing and setting up shops. Wells, storage sheds, and hammer mills were among the preferred assets.

Village A decided to introduce irrigation pumps. This was consistent with the high irrigation availability index in this village (Table 4). Thus these villagers appeared to identify the effect of irrigation on farming production, as our estimation in the maize production function showed. Such consistency in farmers opting for a particular practice or technology could be found in village B, too. Because analysis of the production structure in this village showed a high level of concentration on maize cropping, it was understandable that they were interested in the effective marketing of maize as can be seen from their desire to introduce a storage shed in the village.

In contrast, conservation farming training, livestock husbandry, and entrepreneurship were some of the main extension training topics demanded of the extension workers by farmers. Leadership training was given also to the communities to prepare them for implementation of communal activities. During visits to the 10 villages at the end of 2006, the inhabitants of villages A, B and C indicated that they had good leadership, and those of village D said they had poor leadership. Villages A, B and C had saved more than ZMK 3.5 million in their bank accounts, but village D had no funds in its account. Although our sample size was limited, it was possible to evaluate community capacity for micro-project management in the four villages. Village D showed a lower level of performance than the other

three villages in terms of accumulation of community funds or identification of leadership problems. This relates to these villagers' decision to introduce agro-inputs as IGAs.

Although gains in productivity from such inputs as fertilizer are expected, it is difficult to evaluate this activity in terms of sustainable management of community funds when used to purchase inputs for instance. The use of community funds for purchasing inputs may relate to the capacity for community participation in management of the community funds or common use of infrastructure. That is, the community that finds difficulties in participatory management is likely to hesitate to introduce infrastructure or activities that need community participation. In this context, we can refer to the income-earning structure of Village D. Most members of this village depend on non-farm income activities, especially in the form of permanent employment. For such members, to introduce farm-related activities or infrastructure that require their participation in maintenance and operation is less attractive than their non-farm activities because the opportunity cost of participation is higher.

It is noteworthy that village A introduced sewing machines as IGAs. They use these not only for making school uniforms for their children but also for selling their products to other parents outside the village. In this way, this activity is expected to be an important source of community funds. Although we have not analyzed the background of their decision on this activity in detail, it should be noted that the number of female-headed households is higher in village A than in the other villages (Table 3).

Noteworthy also, is the fact that most of the villagers visited were happier going about their community activities and contributing their labor and time to achieve their goals. A sense of collective action seemed to have reinvigorated the village populations to stand together and do something to find solutions to the problems besetting them.

## 5. Conclusions and Implications

Generally, the results of this study support the fact that farm capital, access to irrigation technology, and soil management in terms of fertilizer use have important impacts on agricultural production. Similar findings have been observed by Chomba (2004), Kapekele (2006), and Pender *et al.* (2004), that is, that soil fertility and soil and water management are critical in the quest to improve production, especially by small-scale farmers.

Land cultivated is an important factor in crop production in Chongwe, as can be seen from the results of the analysis of production function. It implies therefore, that an intervention to help the farmers increase their cultivated areas will improve their production. Labor supply and availability of technical inputs such as hoes, ox-plows, or oxen are more important determinants of how much area a farmer cultivates (Kodamaya, 1989; Bangwe, 1997).

The physical aspects of households, such as location, and human capital issues, such as education and gender, had a vital impact on income generation in households. A farmer's access to non-farm IGAs can markedly affect household income. Access to markets for products seems to be the most important aspect in the ability of households to raise much-needed income. One interesting result was that household income was negatively correlated with the ratio of females in the workers on the farms aged 15 years or more. This result could largely have been due to failure of the survey to capture the numerous female contributions at a household level and to express these contributions in monetary terms, as it is generally agreed in Zambia that rural women do considerably more farm work than their male counterparts (Bangwe, 1997).

This study shows that communities are prioritizing their needs when choosing infrastructure and IGAs. It seems clear that, once they are meaningfully involved in the PaViDIA, communities are willing to participate in the planning and implementation of activities to better their own living conditions. It will be of interest to study this behavior over a longer period of time. Collective action seems to be gaining ground, as can be seen from the willingness of communities to work together toward the common good in the various micro-projects. Asset building or rebuilding and recapitalization are important among small-scale communities, as Bangwe (1997) also observed. However, as Beard (2007) found, communities closer to urban areas tend to contribute less to community activities. These communities may be less socially cohesive, and as a result, households

are less likely to contribute to community management. For any representative conclusion to be made, it is vital that this aspect of this study be extended to capture more communities and variables in Chongwe.

The study has quite a few implications in regard to not only PaViDIA management but also agricultural policy in Zambia. Better soil and water management, if given more prominence at both the policy and project level, may help improve the productivity of rural producers. This result may be achieved by a combination of appropriate technical inputs, such as improved cultivation technologies and practices.

Apart from technology, the improving education is critical to increasing household incomes (Nkonya *et al.,* 2004) and is also important to increasing agricultural productivity (Pender, 2004). Increasing farmers' opportunities away from farm activities may reduce their efforts to increase agricultural output, but at the same time, it may contribute positively to household incomes. Associated with this are gender issues. As observed earlier, more understanding and deliberate efforts may be needed to identify and encourage the contributions of women and youths to both household and community economic growth by endeavoring to measure their contributions.

Community involvement in planning and the management of production, income generation, asset rebuilding, and infrastructural development is very important. This may not only increase community ownership of projects but also ensure a tangible transfer of power to community members, enabling them to participate in their socioeconomic development.

In general, the results of this study indicate that the strategies used to increase production and productivity as well as household and community incomes need to be location-specific. PaViDIA seems to be engaging the farmers well in this regard by allowing the needs of communities to influence the choices of interventions to be implemented in different communities. When all trade-offs in diverse circumstances are made, "a demand driven approach to development will be crucial" (Pender, 2004) not only in the Chongwe District in particular but in Zambia in general.

## Acknowledgements

I appreciate the kindness of the management of PaViDIA for permitting me to access the project's baseline survey raw data for this study.

Profound appreciation goes to the Graduate School of Life and Environmental Sciences at the University of Tsukuba, for guidance and support while I studied in Japan. I particularly acknowledge the contributions of Professor Ryuichi Shigeno and Assistant Professor Hisato Shuto for their patience and guidance in the process of analysis of my study data. I further thank all the lecturers for their support and understanding during the period of my study.

The views expressed here are those of the author and should not be attributed to PaViDIA, or any affiliated institution.

## References

Bangwe, L.M., 1997. Agricultural Change under Structural Adjustment and other Shocks in Monze, Zambia. University of Bath, Centre for Development Studies, pp. 44–46. Internet URL: http://people.bath.ac.uk/hssjgc/lewis1.html

Beard, V.A. 2007. Household contributions to community development in Indonesia, World Dev. 35 (4), 607–625.

Central Statistical Office, Zambia, 1998. Living Conditions Survey in Zambia, 1998. Ministry of Agriculture and Cooperatives, Zambia.

Central Statistical Office, Zambia, 2004. Post Harvest Survey (PHS). Ministry of Agriculture and Cooperatives, Lusaka, Zambia.

Chomba, G.N., 2004. Factors affecting smallholder farmers' adoption of soil and water conservation practices in Zambia. Master of Science Thesis, Department of Agricultural Economics, Michigan State University, USA.

Chongwe District Council, 2006. District Situation Analysis, 2006, Chongwe, Zambia.

El Ghonemy, M.R., 1984. The crisis of rural poverty: can participation resolve it? Studies on Agrarian Reform and Rural Poverty. FAO, Rome Economic and Social Development Series No. 27, pp. 2–10.

Ellis, F., 1992. Peasant Economics: Farm Households and Agrarian Development. Cambridge University Press, New York, USA, p. 3.

JICA, 2004. PaViDIA, Baseline Survey for Chongwe District, Zambia. JICA, 2006. Participatory Approach to Sustainable Village Development (PASViD) in Sub-Saharan Africa. Japan International Cooperation Agency Regional Support Office for Eastern and Southern Africa Nairobi, Kenya.

Kapekele, E.M., 2006. Determinants of slash and burn: the case of chitemene farming system in Zambia. Master of

Science Thesis. Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa.

Kodamaya, S., 1989. Cash crop production and peasant in Southern Zambia. Rural Transformation in African Countries, Institute of Development Economics, Chiba, Japan. pp. 77–111.

Ministry of Agriculture and Cooperatives, Zambia, 2004. National Agricultural Policy, 2004–2015. Ministry of Agriculture and Cooperatives, Lusaka, Zambia, pp. 1–5.

Nkonya, E., Pender, J., Jagger, P., Sserukuuma, D., Kaizzi, C. K. and Ssali, H., 2004. Strategies for sustainable land management and poverty reduction in Uganda. Research Report No. 133. International Food Policy Research Institute, Washington, DC.

Pender, J., Nkonya, E., Jagger, P., Sserukuuma, D. and Ssali, H., 2004. Strategies to increase agricultural productivity and reduce land degradation: evidence from Uganda. Agr. Econ. 31, 181–195.